COACHELLA VALLEY WATER DISTRICT
GUIDELINE K-1
FORMAT AND CONTENT FOR REPORTS SUBMITTED FOR PROJECTS THAT ARE ADJACENT TO CVWD STORMWATER FACILITIES

K-1.1 General Requirements

CVWD operates and maintains regional stormwater facilities within its Stormwater Service Area. CVWD requires that proponents for projects adjacent to or encroaching on the regional stormwater facilities and that affect their performance submit a report for review. Where the project crosses or encroaches on the regional stormwater facilities, the report shall demonstrate that the proposed project does not reduce conveyance or otherwise affect the performance and functioning of the regional stormwater facilities. Where the project discharges runoff to the regional stormwater facilities, the report shall review existing conditions, determine if there is capacity to carry the additional flow and analyze potential impacts on hydraulic characteristics of the stormwater facilities. Development projects within the CVWD Stormwater Service Area that are not adjacent to or encroaching on regional facilities are discussed under Guideline K-5.

It is recommended that the developer meet with CVWD prior to starting their technical analyses. CVWD will discuss the requirements for their specific project and provide existing studies of the project area, hydrologic and hydraulic models (where available), and information on the technical methods and approaches that are acceptable to CVWD.

K-1.2 Report Format and Submission Approach

A completed “Submission Checklist for Projects that are Adjacent to CVWD Stormwater Facilities”, is required with every submittal. CVWD recommends that the proponent’s technical report be submitted in stages or phases for review. Such an approach helps avoid repeating project condition studies several times to account for corrections to existing conditions analyses. CVWD has identified three typical stages for reports: Existing Conditions, Proposed Conditions and Final Design. The project proponent will need to identify a stage for each submittal. The submittals must include all of the items identified in Table K-1.1, which are described in Section K-1.3, for the identified stage of report. Reports that do not meet the minimum requirements will be returned to the developer without a review.

The developer will submit a digital report (PDF format) that is concise, clear and complete, and includes all the information needed for a detailed technical review by CVWD.

K-1.3 Report Contents

Methodologies, technical approaches, adopted models, assumptions, summaries of calculations, and the basis of design of mitigation must be presented in the main body of the report. Detailed technical information, which is too voluminous to include in the main body of the report, will be included in Appendices. Digital copies of input and output files from computer programs should be delivered together with the report. Other relevant and pertinent technical material and data should also be included in Appendices.

The following subheadings describe the chapters and sections typically required for a report submitted under Section K-1. Content and emphasis may vary from project to project.

Executive Summary

Provide a one- or two-page description of the proposed project, technical analyses, the results for both the existing (pre-project) and proposed (post-project) conditions and the mitigation, if any, that is required to maintain the function of the CVWD facility.

Introduction

- Objectives: Briefly describe the report objectives and approach and any agreements with CVWD on submissions and report phasing
- Previous Submissions: Describe previous reports and the review comments that are addressed in this draft
- Project Description: Describe the project and its location in sufficient detail for CVWD to understand potential project impacts
- CVWD and Other Standards: List the standards and guidelines that will be addressed in the reports
- Background Information: List reports, models or other information provided by CVWD or others that are relevant to the project.
- Topography: Describe the source(s) of topography used in the report and its compliance with FEMA map standards. For new topography suitable certifications will be provided in an Appendix to the main report. Clearly identify the datum and coordinate system of the topography used.

Study Area

The content of this chapter will depend on whether or not CVWD has an existing hydraulic model of the project reach. If so, less information is required, and the focus should primarily be on the project site for developing project condition models. Where the proponent will develop a new hydraulic model more detail will be needed to justify model assumptions.

- Project Reach: Describe the reach of the stormwater facility that will be analyzed for existing and project conditions and provide a construction footprint (if available)
- Previous Studies: Summarize relevant studies or observations by CVWD or others.
- Reach Description: Provide aerial and ground photographs and identify any channel or floodplain features that are important for hydraulic modeling.
- Bed material: Provide a map of bed material sample locations, provide corresponding grain size distributions and obtain nearby boring logs or excavation logs, if available, for scour evaluation. Detailed geotechnical information will be included in an Appendix,
- CVWD Facilities: Obtain drawings from CVWD and determine bank and levee crest profiles, the as-built toe elevations of concrete slope protection (if constructed), graffiti barrier requirements (if applicable), landside adjacent grades and design details for other hydraulic structures in the study reach.
- FEMA Effective DFIRM: Describe hazards mapped on the effective map and obtain FEMA's effective model if available and judged useful for analysis of existing and project conditions.
- Other Hazard Studies: Describe hazards identified in studies by other agencies, such as Riverside County, State of California and CVWD.

Hydrology

Contact CVWD to obtain their recommended 100-year design peak flow and hydrograph (if required) for the affected stormwater facility. When new design flows are to be calculated, this chapter will describe the input data and methods adopted for the calculations. Methods for calculating new design flows shall meet CVWD standards described in Guideline K-6. New

design flows for project conditions may be required where the development directs additional stormwater into an existing facility.

- CVWD (or other) 100-Year Floods: If available, CVWD will provide existing hydrologic analyses or models for the flooding sources that meet Guideline K-6.
- Hydrologic Studies: If required, the developer will carry out hydrologic studies to define the 100-year flood, if directed by CVWD. The studies will follow the procedures in Guideline K-6.
- Existing and Project Condition 100-Year Floods: This section will summarize the 100-Year peak flows (and hydrographs, if needed) that will be used in the hydraulic analyses.

Hydraulic Model Development

Contact CVWD to obtain its most recent hydraulic model of the project reach. If a model is not available, the proponent is responsible for developing a new model including the existing and proposed conditions. The nature of the model will depend on the reach being analyzed and the nature of the proposed project. CVWD will consult with the proponent on model selection.

In general, a steady one-dimensional hydraulic model will be suitable for most studies of CVWD stormwater facilities. CVWD requires that an HEC-RAS model is used in these situations. An unsteady model may be required where significant volumes of water leave the channel or return from the floodplain. For these circumstances, CVWD recommends use of current FEMA approved hydraulic models (e.g. HEC-RAS, HEC-RAS 2D), etc. which define lateral weirs to allow flow onto and back from the floodplain. Other models can be used pending approval by CVWD. For some reaches and some projects, a two-dimensional model may be required. Such a model will be required where there are significant overbank flows and the project will partially block these flows or affect their distribution on the floodplain.

The following sections will be required in the report submitted by the developer, but the level of detail will depend on whether a new model is developed for the project:

- Hydraulic Model Selection: The proponent will describe and justify the hydraulic model selected for the project.
- Hydraulic Model Description: The developer will provide a complete description of the model, including model extent, levees and bank crests, cross sections and structures, ineffective areas, roughness, topography, stations and datums, boundary conditions and calibration or sensitivity analysis. CVWD will review model input, output and run files to determine that the model matches the description.
- Sensitivity Testing: In general, observations of high water marks and gaging records are not available for model calibration or verification. CVWD recommends sensitivity testing to examine model sensitivity to variations in roughness, boundary assumptions or other conditions.

Sediment Transport Studies

Sediment transport studies are seldom required for evaluation of project impacts on CVWD stormwater facilities. Studies may be required where transported sediments will be trapped or removed from the channel or where significant additional flows are added to an existing facility.

Existing Conditions Results

The analysis of project impacts generally compares existing (pre-project) and proposed (post-project) hydraulic conditions. The particular hydraulic parameters that will be compared depend on the nature of the hazards and the nature of the project but typically include a water surface profile for the 100-Year flood, depths, velocities and derived parameters such as shear stresses,

scour depths or sediment transport rates. Where the 100-Year flood overtops banks or levees, the extent of inundation and hydraulic characteristics on the floodplain will also be required.

Hydraulic characteristics will be summarized in tables and figures in the main body of the report with detail in Appendices. This chapter will generally include the following information:

- Water Surface Profiles: A 100-Year water surface profile for the reach, showing bank top or levee crest elevations, etc. Depths and velocities can be summarized in tables or on maps, depending on the hydraulic model adopted for analysis. Where multiple model runs are required to simulate non-accredited levees or other conditions, the report will show the maximum depths and velocities for each cell, based on all the runs.
- Areas of Inundation: Extent and hydraulic characteristics of overbank or floodplain flows, where these occur.
- Erosion: Identify any sections of bank that are likely to erode during the 100-Year flood, based on the results of the hydraulic model and the extents and nature of existing bank protection.
- Scour Profiles: Provide profiles showing existing minimum scour elevations and the toe of slope protection, for both banks. Where present, scour profiles for in-channel structures are calculated separately and incorporated into the general scour profile. Guideline K-3 provides recommended methods for calculating scour.

Project Condition Results

This chapter compares existing and project conditions for the following categories and summarizes project impacts on CVWD's facility:

- Water surface profiles
- Inundation or floodplain hydraulic characteristics, if required
- Erosion: Identify any changes in the extent of erosion areas as a result of altered in-channel velocities from the project or erosion protection required by CVWD for the specific project
- Scour: Identify project impacts on scour. Guideline K-3 provides specific guidance on the extent of protection required for bridges and other structures
- Profile Adjustments: Analysis of channel slope adjustments will be required if the project adds or removes a structure that provides grade control for the bed of the CVWD facility. Guideline K-3 provides recommended methods.
- Summary of Project Impacts: A summary for all of the subreaches that will be affected by the project. The impacts should be presented in tables and as a profile.

Mitigation Plans

CVWD prefers that the proponent design their project to eliminate or minimize impacts on CVWD facilities, particularly impacts on 100-year water surface profiles. Where impacts on facilities remain, the proponent will provide a basis of design and design plans for modifications of the CVWD facility, such as levee raises, concrete slope protection or other appropriate features. The basis of design and design plans will meet CVWD standards and guidelines, as expressed in the DDM and Appendix K.

- Description of Works: Describe the general nature of the works – levees, stormwater channels, bank protection, sediment traps, etc. – and show their location and extent on a map of the development
- Design Standards: Describe the applicable CVWD and other guidelines and standards that are applicable to the design of the mitigation features

- Basis of Design: Describe the procedures adopted for the design of the various works.
- Design Plans: Typically, the initial submission consists of conceptual plans (30% design).They will show plans, profile and typical sections of the mitigation works with suitable stationing, design water levels, top of slope elevations, channel bottom elevations, typical sections, and design details for hydraulic structures.

CVWD will advise the proponent on the schedule for submission of intermediate and final plans for review.

Results and Conclusions

Provide a narrative of the results of the studies, required mitigation, and describe compliance of the project with CVWD Ordinances and other standards and guidelines.

References

CVWD requires a complete bibliography of all reports, publications, or books that are referred to in the report. The bibliography should be sufficiently detailed to identify and locate specific publications. In general, CVWD does not recommend referencing draft reports; however, in some circumstances these may provide the most up-to-date technical approaches and methods.

Appendices

The appendices should include photographs, technical information that is too voluminous to be included in the main body of the report, specific studies (such as bed material measurements), raw data, and computer model input and output files. All data shall be presented in an electronic format on DVD, CD or other storage media.

Submission Checklist for Projects that are Adjacent to CVWD Stormwater Facilities

Submittal Instructions

To better streamline project approvals CVWD has expanded on the instructions within guideline K-1 and developed a checklist to aid project proponents through a more efficient review process. Details on the necessary analysis and contents that are required are given within Guideline K-1. This form must be filled out, signed and provided with a transmittal as an attachment for all developer submissions.

Initial submittals need to include a deposit of $10,000.
Initial Submittal (Y/N): _____

Submittal Stages

CVWD has defined three sequential stages of submittal within the review process**.** The project proponent is required to identify which stage the submittal corresponds to, to help guide the review. The stages are defined as:

- Stage 1 includes the necessary analysis to establish the existing baseline conditions;
- Stage 2 provides a project conditions analysis including a description of the project features and proposed preliminary mitigation plans;
- Stage 3 provides the final detailed design details, mitigation and plans for the project.

Completion of Stage 2 is required before CVWD provides approval to local land agencies for entitlement. Completion of Stage 3, which includes the final design, is required prior to grading and construction of the project. For projects with established regional hydrology and hydraulic models completion of Stage 1 is not required prior to submittal of Stage 2 information for review, although it may be beneficial to reduce potential rework.

In the table below put an (X) next to the level of submittal. If the submission does not fit into any of these categories, please coordinate with CVWD.

Stage	Description of Submission	(X)	Approved (y/n)
1	Existing Conditions		
2	Proposed Conditions and Concept Acceptance		
3	Final Design		

Minimum Report Requirement Checklist

The developer shall submit a digital report that is clear, concise, complete, and includes all the information needed (as identified in Table K-1.1) for a detailed technical study. Below is a list of requirements for such submissions to CVWD based on stage. This includes chapters and headings for sections of the report and typical illustrations required. The project proponent should consult Guideline K-1 for details. If the submissions provided are missing items listed in the checklist, the reports will be rejected without detailed review. Submissions that do not meet these minimum requirements will only be reviewed upon written request to CVWD. A space for additional notes is provided after the checklist.

Name of Report: _____

Date: _____

TABLE K-1.1:
DEVELOPERS MINIMUM REPORT REQUIREMENT CHECKLIST

Chapter and Subheadings		Typical Illustrations	Stage Requirements			Included (X)
			1	2	3	
	Executive Summary		*	*	*	
1	***Introduction***					
1.1	*Objectives*		*	*	*	
1.2	*Previous Submissions*		*	*	*	
1.3	*Project Description*	Vicinity and Local Maps showing project boundaries and location	*	*	*	
1.4	*CVWD Standards* Summarize standards and guidelines that apply to the proposed project		*	*	*	
1.5	*Proposed Technical Approach*		*	*	*	
1.6	*Summary of Background Information*		*	*	*	
1.7	*Topography*	Area covered by topo source	*	*	*	
2	***Study Area***					
2.1	*Project Reach* Section of CVWD facility to be analyzed for project impacts	Project Reach Map Construction Footprint Map	*	*	*	
2.2	*Previous Studies*		*	*	*	
2.3	*Reach Description* Bed and bank materials, extent of CSP, features that affect analysis	Bed material sample location map Bed material grain size distribution Extents of concrete slope protection Other instream structures Photographs of Reach (Appendix)	*	*	*	
2.4	*CVWD Facilities*	Drawings from CVWD including profiles with elevations	*	*	*	
2.5	*FEMA Effective DFIRM*	Applicable portion of FIRM or Firmette of project reach	*	*	*	
2.6	*Other Hazard Studies*	Water Surface Profiles, extent of inundation or other relevant factors	*	*	*	
3	***Hydrology***					
3.1	*CVWD Facility Design Flow*		*	*	*	
3.2	*Review of Previous Studies* (if no adequate design flow)		*	*	*	
3.3	*Hydrologic Studies* (if required)	Watershed subdivisions, soils and geology, land use, land cover, etc	*	*	*	
3.4	*Recommended Existing and Project Flows*		*	*	*	
4	**Hydraulic Model Development**					
4.1	*Model Selection*		*	*	*	
4.2	*One-Dimensional Steady Applications* Model Extent; Levees and Bank Crest Elevations; Cross Sections and Structures; Ineffective Areas; Roughness Topography, stations and datums; Boundary Conditions;	Model Boundaries and location of cross sections Channel photographs for roughness Bridge or hydraulic structure surveys	*	*	*	

	Calibration (where applicable); Verification or Sensitivity Analyses					
4.3	*Two-Dimensional or Unsteady Applications* As above, plus Model Characteristics, Lateral Structures and Floodplain Areas	As above, plus Results of Model variations runs	*	*	*	
5	***Sediment***					
5.1	*If required, content determined in discussion with CVWD*		*	*	*	
6	***Existing Condition Results***					
6.1	*Channel and Bank Profiles* Summarize sections of overtopping, inadequate freeboard, etc and compare to previous studies	Water Surface, Levee Crest, and Toe of Slope Protection Profiles (Both banks, if required) Velocity, depth, shear stress or other profiles, as appropriate	*	*	*	
6.2	*Areas of Inundation*	Map of the extent of inundation	*	*	*	
6.3	*Scour Analysis* General scour calculations for the project reach Structure scour, as required	Profiles of minimum general scour elevations and toes of bank protection (both banks, if required) Scour profile downstream of structures	*	*	*	
6.4	*Degradation/Aggradation Analysis* Required if project removes or adds grade control structures	Existing bed and equilibrium bed profile, including intermediate profiles	*	*	*	
7	***Project Condition Results***					
7.1	*Channel and Bank Profiles* Compare Existing and Project Conditions	Existing and Project Water Surface, Levee Crest, and Toe of Slope Protection Profiles (Both banks, if required) Existing and project velocity, depth, shear stress or other profiles, as appropriate		*	*	
7.2	*Areas of Inundation* Compare Existing and Project Conditions	Maps of Existing and Project inundation		*	*	
7.3	*Scour Analysis* Compare Existing and Project general scour calculations for the project reach Structure scour, as required	Existing and Project profiles of minimum general scour elevations and toes of bank protection (both banks, if required) Scour profile downstream of structures added, if required		*	*	
7.4	*Degradation/Aggradation Analysis* Compare Existing and Project long-term bed profiles	Existing bed and project equilibrium bed profile, including intermediate profiles		*	*	
7.5	*Summary* Summarize project impacts on existing CVWD facilities	Tables or figures showing subreaches that will be affected by the project and the extent of impact		*	*	

8	***Mitigation Works***					
8.1	*Description of Required Works*	Extent and Location of Required Works			*	
8.2	*Design Standards*				*	
8.3	*Basis of Design*				*	
8.4	*Design of Required Works* Concept to Final design submissions	Plan, profile and typical sections of required works			*	
9	**Results and Conclusions**		*	*	*	
10	**References**		*	*	*	
	Appendices					
	Photographs		*	*	*	
	Bed Material Analyses		*	*	*	
	Hydrologic Model Input/Output	Digital files only	*	*	*	
	Existing Hydraulic Model Input/Output	Digital files only	*	*	*	
	Project Hydraulic Model Input/Output	Digital files only		*	*	
	Mitigation Works Plans				*	

Notes: Any additional information required or reasoning or justification for exclusion of items identified in the checklist should be given below:

Developer Signature (Not Valid Without)
The above form was filled out to the best of my ability for the project specified.

Name: _____

Firm/Company Submitting: _____

Address: _____

Phone: _____